

ON SOME ANOMALIES IN DENTITION OF PREHISTORIC CANIDS

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INTRODUCTION

The dentition in the genus *Canis*, that includes the dog, jackal, wolf, civet and allied species, is typically 3142/3143. But occasionally supernumerary or subnumerary teeth are also encountered during odontological investigation. While studying some osteological material in the Prehistoric Zoology Laboratory of the department, the author came across such anomalies in the dentition of a few Canid specimens. The details of the study is the subject matter of the present communication.

MATERIAL

- Sp. No. 1 - Intact skull, *Canis familiaris* ; Loc, Lalpahar, South Andaman, 1980 (Kitchen Midden), Coll. S. Banerjee.
- Sp. No. 2 - Complete mandible, *Canis lupus* ; Reg. No. 3293, Loc. Burzahom Kashmir ; BZH - 3, A11 ; SEQD ; Pit 1 (Neolithic) ; Coll. Archaeological Survey of India.
- Sp. No. 3 - Complete mandible, *Canis familiaris* ; Reg. No. 3136, Loc. Burzahom Kashmir, BZH - 3, B11 ; SEQD ; Pit 1 (Megalithic) ; Coll. Archaeological Survey of India.
- Sp. No. 4 - Damaged mandible, *Canis familiaris* ; Reg. No. 3280, Loc. Burzahom, Kashmir, (Early Neolithic) ; Coll. Archaeological Survey of India.
- Sp. No. 5 - Damaged mandible, *Canis familiaris* ; Reg. No. 3036, Loc. Burzahom, Kashmir ; xxx' - xxivx', Pit 7 cut into 9 sealed by 8, (Early Neolithic), Coll. Archaeological Survey of India.

OBSERVATION

All the specimens were of un-sexed, adult subjects. In the skull of dog from South Andaman (Sp. No. 1, Fig. A) the formation of M_3 in the left maxilla is an interesting anomaly. The molar is normal in its constitution, having tuberculated cusps and three roots, which are well embeded in the alveoli. The mandibular specimens are all from Burzahom, Kashmir. The presence of one extra anterior premolar, structurally resembling the P_1 is seen on the left ramus of a wolf's jaw (Sp. No. 2, Figs. B&D). Likewise, another jaw of a dog also shows the presence of such extra premolar, anterior to P_1 on its right ramus (Sp. No. 3, Fig. C). Both the premolars have a single root, protoconid cusp and a cingulum behind, and as such deserve the ordinal number P_1 . The specimen No. 3, of course lacks the last molar

M₃ on right ramus. Specimen No. 4, (Fig. E) damaged mandible of a dog does not show the anterior premolar P₁ on the right ramus and likewise the specimen No. 5, (Fig. F), another damaged lower jaw lacks it on the left. The last three examples are cases of subnumerary dentition. The supernumerary upper molar (M₃) and lower premolars (P₁) quoted above were morphologically perfect, having distinct crown, neck and root regions, composed of the essential elements *viz.*, enamel, dentine and a little root-cement.

DISCUSSION

The canids belong to the fissiped carnivores. In present day carnivores as well as the extinct Paleocene Creodonts, the maximal monodelphous dental formula 3143/3143=44 never exceeds and most of the placental mammals, which have been derived from early tertiary forms, had similar dentition (Peyer 1968). Barring the pig and mole, majority of the recent mammals have acquired a reduced dentition during evolution. The genus *Canis* is also not an exception to it and lacks two upper third molars (M₃) and has species-specific dentition 3142/3143=42. Excepting the case of African wild dog *Otocyon*, in which minor increase in the cheek teeth *i.e.* 314(3-4)/3144 is observed, most of the recent species of carnivores have much reduced dentition, *e.g.* Dole 3142/3142, Felids 3121/3121, Hyenids 3141/3131. Therefore, when a progressive reduction in the number of cheek teeth are met with in the much evolved later forms, sudden re-appearance of a pristine molar or development of additional premolars, is interesting. Though the dentition in the wild species is rather uniform and follows rigidly the species-typical dentition, anomalies are also found to occur in them. Nellis (1972) observed a number of dental abnormalities involving both supernumerary and subnumerary dentition in wild Coyotes (*Canis lutrans*) from central Alberta. He also found the presence of such extra premolars (P₁) in two specimens and third upper molar (M₃) in one specimen of Coyotes.

In domestic dog, the upper cheek teeth are generally six and the lower cheek teeth are seven. But in extreme brachycephalic breeds, these numbers may be further reduced to 5/7 or even less (Sisson & Grossman 1953). So, the breed-oriented reduction of teeth or individual loss of certain tooth are not very uncommon in the recent dogs. But the re-appearance of a vestigial molar or formation of additional premolars in some prehistoric dogs, including one that belongs to a wolf are noteworthy. The remains from Burzahom, Kashmir are dated to 2500 B.C., but the skull from Kitchen midden of South Andaman is not much old and is assumed to be 200 - 500 years B.P.

The development of the upper third molar M³, in the skull of a dog (Fig. A) from South Andaman (Kitchen Midden) may be accounted as a sudden recapitulation of the paligenetic dentition (*i.e.* 3143) in the left maxilla against the cenogenetic (*i.e.* 3142) retained by the opposite side. It is morphologically reciprocal to the lower M³, and from the ground condition of the (tri-) tuberculated cusps, it is evident that the tooth received regular resistance from the lower M₃ when the beast was alive. The additional M³ in Coyote studied by Nellis (1972) also had three roots,

skull is rather roundish like the lower M_3 in shape. The upper and lower cheek teeth in *Canis* do not correspond but rather dovetail. Normally, the rudimentary, single rooted lower last molar is not occlusal to the upper last molar (M^2) and practically in the absence of M^3 , remains un-opposed and thus functionally becomes less important. Probably this is the reason for occasional loss or complete non-formation of the tooth as is testified by one of the present material also (Sp. No. 3). Nellis (1972) also mentioned that the most common dental anomaly involved is in the loss of M_3 and he accounted for its rudimentary structure and remote situation. The present author assumes that like the vestigial upper M^3 , the lower M_3 in dog may also become degenerate someday. However, due to the presence of M^3 , the length of the cheek teeth series in Sp. No. 1, becomes 3.50 mm longer and reaches the periphery of the palatine plane.

The existence of five functional premolars in the lower ramus in specimen Nos. 2 & 3 are also example of supernumerary dentition. Nellis (1972) observed such premolars anterior to P_1 in both the jaws of one Coyote and on the left jaw of another. Generally, in *Canis*, the first cheek tooth appears only once at the age of 4-5 months and does not have any descendant thereafter. So, it is difficult to consider that a milk P_1 and a secondary P_1 simultaneously occupy two different alveolus without replacing one another and continue to grow and function. the occupation of more anterior portion of the jaw by the additional P_1 diminishes the C- P_1 gap, meant for the accomodation of upper canine by 3-5 mm. The presence of the five premolars in alinement (3153) poses difficulty in assessing their seniority and in assigning the ordinal numbers. If the premordial premolar is put with ordinal number P_1 , then the last premolar, mesial to M_1 is to be ordinated P_5 .

The non-formation of M_3 in specimen No. 3 and P_1 in specimen Nos. 4 & 5 are examples of subnumerary dentition. Presumably these teeth were not developed at all as is evident from the absence of any alveolar scar and no special dental cells (odontoblast/ameloblast) could be differentiated in the area. The absence of P_1 increases the alveolar gap between C- P_2 by 5 mm. and renders the portion of the ramus more diastema like. The absence of lower M_3 in specimen No. 3, decreases the length of cheek teeth series by 3 mm. Generally from carnassial, the teeth diminish in size and in number of roots both forward and backward. Therefore, missing of anterior premolar or posterior molar in the dog are not surprising. But development of unusual tooth is interesting from the point of genetics and odontology.

SUMMARY

One extra upper molar (M^3) and two additional premolars (P_1), examples of supernumerary dentition and missing of lower third molar (M_3) and anterior premolars (P_1) example of subnumerary dentition have been observed in some prehistoric remains of Canids from Burzahom, Kashmir and South Andaman. Loss or non-formation of anterior or posterior cheek teeth are more common in *Canis* as these teeth are rudimentary in structure, but supernumerary teeth in *Canis*, that too in prehistoric forms is noteworthy from the point of dental anatomy. It has probably resulted from genetical or developmental disorder. It appears that in

absence of the upper last molar (M) in dog, the lower one (M₃) becomes non-functional and therefore may become completely degenerated someday.

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